when reconstituted in water under typical food processing conditions. This physical state is to be distinguished over "aggregates", which are firmly bound components in particle form that remain bonded to each other even if reconstituted in water under typical food processing conditions.

Encapsulation of oils as described above allows for loading of larger amounts of oil than if they were encapsulated in a native starch granule. Absorption of oils using cyclodextrin is limited by the particle size of the guest molecule (oil) and the cavity of the host (cyclodextrin). Traditional cyclodextrin molecules trap the oil completely inside their cavity thereby limiting the size and amount of the oil encapsulated. It is difficult to load more than about 20% oil into a cyclodextrin particle. However, encapsulation with a starch that has been modified to have emulsion properties does not impose this limitation. Since the encapsulation in the present invention is achieved by entrapping oil droplets of less than 15 microns, preferably less than 5 microns and most preferably less than 2.5 microns in size, within a modified starch matrix, more oil can be loaded based on the type, method and level of modification of the starch. Encapsulation with the modified starches described by this invention allows loads much greater than 20% oil.

Other suitable matrix materials and process details are disclosed in, e.g., U.S. Pat. No. 3,971,852, Brenner et al., issued Jul. 27, 1976, which is incorporated herein by reference.

It will be understood by those skilled in the art that they may make substitutions of chemical or physical equivalents to the above cited components. While such substitutions represent a less preferred embodiment of the current invention, all are deemed to be protected hereunder.

WE CLAIM:

1. A composition comprising a) a microreticulated or microfibrillated microcrystalline cellulose, or powdered cellulose, b) an oil, c) a modified starch, and d) a synthetic, amorphous precipitated silica (silicon dioxide).

2. The composition of claim 1 wherein the weight ratio of cellulose to oil in the dry composition is from about 0.60-0.75:1.0.

3. The composition of claim 1 wherein the cellulose is microreticulated or microfibrillated microcrystalline or powdered.

4. The composition of claim 1 wherein the oil that is a liquid between about 10.degree. C. and 90.degree.

5. A process for preparing the composition of claim 1 comprising forming an intimate mixture consisting essentially of microreticulated or microfibrillated microcrystalline cellulose, or powdered cellulose and an oil by blending from 30 to 60 seconds.

6. The composition of claim 1 wherein the modified starch such as malto-dextrin has a low dextrose equivalent, of approximately 10 or lower.

7. The composition of claim 1 wherein the weight ratio of modified starch to intimate mixture of claim 5 in the dry composition is from about 0.20-0.25:1.7.

8. A process for preparing the composition of claim 1 comprising forming an intimate mixture consisting of the intimate mixture of claim 5 and a modified starch by blending from 30 to 60 seconds.

9. The composition of claim 1 wherein the silicon dioxide is a synthetic, amorphous precipitated silica such as Sipernat.

10. The composition of claim 1 wherein the weight ratio of silicon dioxide to the intimate mixture of claim 8 in the dry composition is from about 0.10-0.15:1.9.

11. A process for preparing the composition of claim 1 comprising forming an intimate mixture consisting of the intimate mixture of claim 8 and a silicon dioxide by blending from 30 to 60 seconds.

12. A process for preparing the composition of claim 1 comprising particle size milling of the intimate mixture of claim 11.

ABSTRACT

Modified starch encapsulated organic particles, and a process for making said particles and products comprising such particles are disclosed. Such particles provide a simple, efficient and effective delivery system that can be used to deliver organic solutions such as oils to compositions.